A Study of Impingement of Stock Market on Indian Economy

Mr. Pankaj Bhatt[1], Dr. Nistha Sharma[2], Mr. Kuldeep[3]

[1]Assistant Professor, Department of Management Studies, Shriram Institute of Management and Technology, Kashipur
[2]Assistant Professor, Department of Commerce, Shriram Institute of Management and Technology, Kashipur
[3]Assistant Professor, Department of Management Studies, Shriram Institute of Management and Technology, Kashipur

ABSTRACT

In terms of purchasing power parity, the Indian economy is one of the biggest and is expected to keep expanding in the near future. Nevertheless, the nation's thriving economy is expected to go through a number of ups and downs, including changes in the stock market, which can have a big influence on its development. For instance, the Indian stock market experienced a large, methodical reorganization from 1994 to 2005. Highlights of the Indian economy during this time period included an average GDP growth of 6.1%. Present research study is based on secondary data, collected from Annual Reports of Reserve Bank of India and official websites of NSE & BSE. The sample is ranged from year 2001-2022. For the purpose of the study, a linear regression model is incorporated to know the relationship between the stock indices, i.e., Nifty and Sensex and Gross Domestic Product (GDP). The regression model asserts that the movement in the stock market indices impacts the GDP positively in long run.

Keywords: GDP, NSE, BSE, Regression

1. INTRODUCTION

The stock market has always been treated as gauge for GDP (Gross Domestic Product). A positive change in GDP will unify the stock market and due to which the market runs bullish and hence flourish the wealth and confidence leading to more spending and higher GDP. So therefore, it becomes indispensable to understand the correlation between the real growth of economy and stock market. When GDP escalates, it has positive impact on your investment portfolio. So performance of your investment will depend upon India's GDP. As per the data provided by economic outlook (December 2019), there has been interesting relationship between these two from year 2004 to 2008, the GDP was 8% also Nifty 50 index moved 2000 + to 4000+. Year 2008 has been a time of global recession, GDP was only 3% and Nifty 50 went from 4000 + to 3000 +, leading to loss if you invested that time causing negative impact. Later in 2009-2011, GDP recovered and stock market started to gear up. In 2011 -2013, GDP fell due to increase in oil prices and inflation etc. In next five years, GDP marked at 8% and the market flourished again.

Aberration in GDP and stockmarket

During 2019, the GDP and Nifty 50 index went in opposite directions, the big divergence, which continued in 2020 and 2021 as well. There are many factors, which lead to the divergence. Stock market and returns are always future oriented, so people were still positive and trading at lower GDP rates. To tackle COVID-19 pandemic, government infused many financial packages, which resulted inliquidity in hands of people leading them to trade in stock market (Rai D. 2020). Moreover, Reserve Bank of India used aggressive policy and slashed the rates of fixed deposit etcetera; due to which investors has no option other than investing. No doubt large listed companies managed to mitigate the impact of COVID-19 and which gained the confidence in the eyes of investors to invest more. As for the market experts, this divergence is temporary and will get corrected in some time.

GDP growth rates are important to investors because they help them assess how the economy is developing and alter their asset allocation accordingly. A downturn in the economy, however, results in poor corporate profitability, reduced stock prices, and a tendency for consumers to reduce their spending. On the basis of comparisons between nations' growth rates, investors are also on the hunt for possible investments, both domestically and internationally.

2. A BRIEF REVIEW OF LITERATURE

Vasani Sureshbhai Vithalbhai (2020), in his research paper "Analysis of Impact of Gross Domestic Products (GDP) on Stock Market Movement in India" highlighting the relationship between the GDP and stock market movement from 2011-2012 to 2019-2020. The researcher has used in the study probability sampling method and the study is based on secondary data, using different statistical tools like Karl Pearson's, Simple Correlation and Simple linear regression model. On the basis result of correlation, he concluded that there is strong relationship between GDP and Stock Market Movement in India. The result depicts that a change in GDP impacts the stock market.

D. V. Lokeswar Reddy (2012), conducted the study to know the relationship between stock market returns with respect to inflation, GDP and interest rates. The study is based on secondary data related to stock market returns, inflation, GDP, interest rates of last 10 to15 years, using statistical tools like regression, correlation to find out the nature and strength of the relationship between the variables under study. He enunciated that there is impact of GDP, inflation rate and interest rate on stock market price movements and suggested that interest rate should be kept at moderate prices and government should make policies to reduce the inflation rate and interest rates in Indian economy.

Mian Sajid Nazir, Muhammad Musarat Nawaz, and Usman Javed Gilani (2010) conducted a research study on relationship between stock market development and economic growth in Pakistan for the years 1986 to 2008. Size and liquidity were used as two important factors while studying stock market development. The results show that the stock market development influences the process of economic development in Pakistan.

Dr. Kishorsinh N. Chavda (2018) in the research paper "Analysis of Impact of Gross Domestic Products (GDP) on Stock Market Returns in India" highlighted the impact of GDP on stock market returns. This explanatory research is based on secondary data for 10 years (2008 to 2017). Various descriptive tools of statistics like Geometric Mean (GM), Variance, Co-Variance (COV), Standard Deviation (S.D), Co-

efficient of Variance (C.V), Karl Pearson Correlation, Spearman's Rank Correlation, Regression Analysis, ANOVA (One Way). The findings suggest that role of stock market (BSE Sensex Index) is one of the most important influencing factors of GDP and vice versa. This study also enunciated that there is positive or linear or significant relationship between BSE Sensex Index and GDP Growth Rate in India.

Abhirup Mitra (2022) in the paper titled "A Study on the Cause-Effect Relationship between Gross Domestic Product and Stock Market Performance in India", highlighted the cause and effect relationship between Indian economic growth and stock market performance. The research study is quantitative research and is based on secondary data, in which stock market data of BSE and GDP rate data is analyzed for 22 years (period 1998 to 2019). The data analyses show that GDP affects the Indian stock market.

Mohammad Alawin (2018) in the research paper titled "The Relationship between Economic Growth and Stock Market", analyzed the secondary data for Nigeria and United Arab Emirates for the time period (years 2004- 2015). The data was analyzed with vector autoregressive model for knowing the relationship between economic growth and stock market variables. In addition, the vector error correction model is used to study the short-term and long-term relation between the variability. The research study shows that there is a positive relationship between stock market and economic growth in both the countries i.e. United Arab Emirates and Nigeria.

3. OBJECTIVES OF THE STUDY
I. To find out the relationship between Economic growth and Stock market in India.
II. To observe the trend of GDP, Nifty and Sensex Since 2001-2022.

4. HYPOTHESES
Null Hypothesis (H_0): Stock market movements do not influence the GDP of India.
Alternate Hypothesis (H_a): Stock market movements influence the GDP of India.

5. RESEARCH METHODOLOGY
The research study is based on secondary data collected from the official websites of the Reserve bank of India, BSE and NSE for the period (2001- 2022). Geometric mean of Yearly averages of NSE Nifty and BSE Sensex (Indices) is taken as predictor variable while GDP as dependent variable. Data were collected and recorded in MS Excel and further processed in EViews 10 and SPSS for analysis.
Statistical methods used in this study are as follows:
A linear regression Model is applied, taking log transformation of the variables as follows:
$$(\text{LogGDP})_t = \beta_0 + \beta(\text{LogIndices})_t + \epsilon_t \ \ldots\ldots\ldots\ldots (1)$$
Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test is used to know the stationarity of the series.
$$\text{KPSS} = n^{-2} \sum_{t=1}^{n} \frac{S_t^2}{\sigma^2} \ \ldots\ldots\ldots\ldots.. (2)$$
For residual diagnostic, Jarque-Bera Test for Normality and: Breusch-Pagan-Godfrey test for Heteroscedasticity is used.

6. DATA ANALYSIS

Data analysis for the present study is as follows:

6.1.Trend in GDP, NSE Nifty and BSE Sensex since 2001-2002

Figure 1 displays the trend of GDP of India, NSE Nifty and BSE Sensex since 2001-2002. It is clearly observed that for last two decades GDP is positively correlated with stock market indices in long run.

Figure 1: Trend in GDP, NSE Nifty and BSE Sensex since 2001-2002
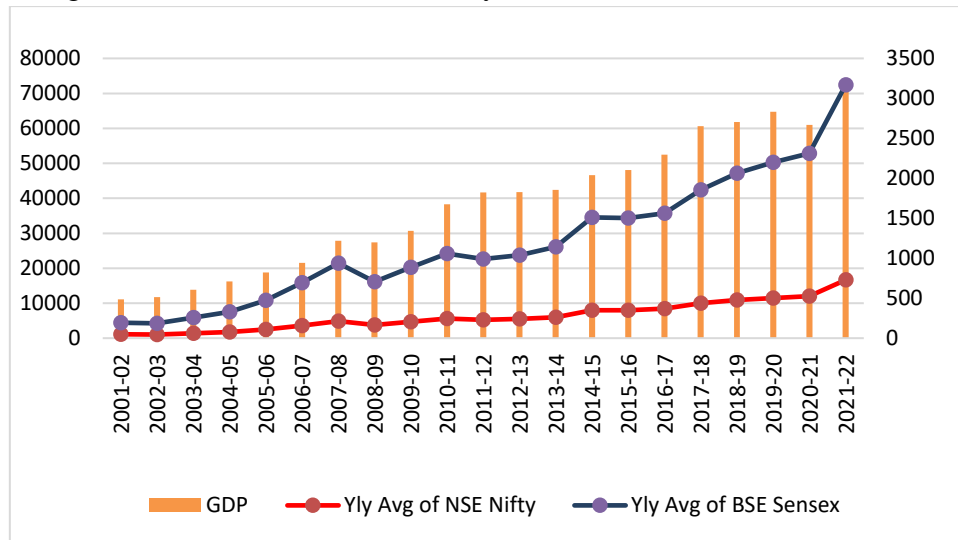
Source: Data compiled from handbook of statistics on Indian economy, 'www.rbi.org.in' and 'www.nseindia.com'

6.2. Relationship between GDP and Stock Market Indices

Granger and Newbold (1974) suggested concept of 'spurious regression' in their research paper. Spurious regression occurs when two non stationary time series found statistically significant and show misleading inferences. To execute linear regression model, stationarity of time series data at level values is mandatory.

6.2.1. Unit root Test

Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test is used to check whether the two series are stationary or not. Hypothesis for the KPSS test are as follows:

Null hypotheses: LogGDP is stationary, LogIndices is stationary

Alternate hypotheses: LogGDP is not stationary, LogIndices is not stationary

Table 1 and Table 2 represents KPSS test statistics for LogGDP and LogIndices respectively, and decision rule states that if p-value > 0.05, null hypothesis can't be rejected and we can state that both series are stationary at level values.

Table 1: Kwiatkowski-Phillips-Schmidt-Shin test on LogGDP

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.576406
Asymptotic critical values*:	1% level	0.739000
	5% level	0.463000
	10% level	0.347000
*Kwiatkowski-Phillips-Schmidt-Shin (1992)		
Residual variance (no correction)		0.058515
HAC corrected variance (Bartlett kernel)		0.186250

Table 2: Kwiatkowski-Phillips-Schmidt-Shin test on LogIndices

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.565529
Asymptotic critical values*:	1% level	0.739000
	5% level	0.463000
	10% level	0.347000
*Kwiatkowski-Phillips-Schmidt-Shin (1992)		
Residual variance (no correction)		0.105231
HAC corrected variance (Bartlett kernel)		0.321036

6.2.2. Linear regression Model

Since both time series data set are stationary at level values therefore, a linear regression model having LogGDP as dependent variable and LogIndices as predictor is applied to establish a linear relationship between both the variables

$$(\text{LogGDP})_t = \beta_0 + \beta(\text{LogIndices})_t + \epsilon_t \ldots\ldots\ldots (1)$$

Where, $(\text{LogGDP})_t = $ Log transformation of GDP at time t,

$(\text{LogIndices})_t = $ Log transformation of Indices at time t, and

$\epsilon_t = $ Error Term

Table 3 shows the value of correlation coefficient between both variables is 0.98, it states that there is a very strong positive association between variables whereas R square value depicts the explanation capacity of predictor which is very high.

Table 3: Summary of Linear Regression Model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.986[a]	0.971	0.970	0.04444139

Predictors: (Constant), LogIndices

Analysis of Variance (ANOVA) statistics articulate the acceptability of the model. Since the F value is significant at the 1% level of significance as shown in table 4 ($p < 0.05$).

Table 4: Analysis of Variance table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.275	1	1.275	645.756	0.000[b]
	Residual	0.038	19	0.002		
	Total	1.313	20			

Dependent Variable: LogGDP

Table 5 shows coefficient of the constant and predictor variable. Coefficient of LogIndices (β), was found positive (0.986) and significant (t =25.412, p =0.000) at 1% level of significance. The finding discards our null hypothesis (H_0) and states that movement of stock indices influence the GDP of India.

Table 5: Coefficients of Regression Model

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.341	0.112		3.056	0.007
	LogIndices	0.715	0.028	0.986	25.412	0.000

6.2.3. Residual Statistics

In a regression model residual diagnostic is essential part as residual must follow normal distribution and absence of heteroscedasticity in residuals is necessary to claim the credibility of the model.

Figure 2 displays the residual graph for the regression model and table 6 exhibits the Jarque –Bera test statistics.

Figure 2: Residual Graph
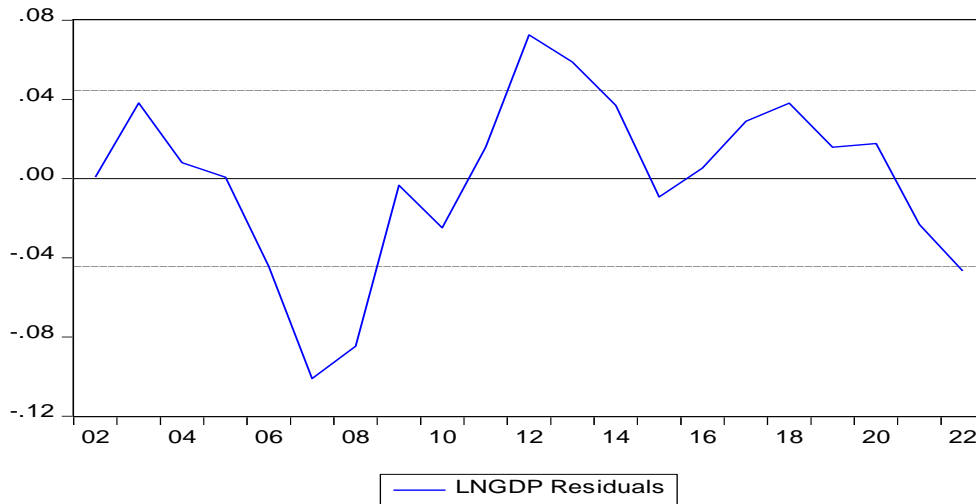
Jarque-Bera Test for Normality

Null hypothesis: Residuals are normally distributed.

Alternate hypothesis: residuals are not normally distributed.

Table 6 shows kurtosis is near the standard 3, and p value for Jarque-Bera statistics is more than 0.05, according to the decision rule null hypothesis cannot be rejected.

Table 6: Jarque-Bera Test Statistics

Mean	Maximum	Minimum	Std. Dev.	Kurtosis	Jarque - Bera	Prob
0.00	0.07255	-0.10104	0.043316	3.155114	1.616952	0.445537

Heteroscedasticity Test

Null hypothesis: Residuals are not heteroskedastic.

Alternate hypothesis: Residuals are heteroskedastic.

Breusch-Pagan-Godfrey test statistics are summarized in table 7. Since chi square probabilities are more than 1, therefore, according to the decision rule null hypothesis is accepted i.e., residuals are homoscedastic and have constant variance across the sample.

Table 7: Heteroscedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.000391	Prob. F(1,19)	0.9844
Obs*R-squared	0.000433	Prob. Chi-Square(1)	0.9834
Scaled explained SS	0.000382	Prob. Chi-Square(1)	0.9844

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.001923	0.006922	0.277868	0.7841
LogIndices	-3.46E-05	0.001747	-0.019782	0.9844

Figure 3 indicates actual and predicted residual graph. Residuals are randomly scattered around residual=0, this conveys the appropriateness of linear regression model.

Figure 3: Actual, Fitted Residual Graph

7. CONCLUSION

There are several aspects of the stock market that support an expanding economy. It is challenging to forecast precisely how the stock market may impact the economy due to its unpredictability. To estimate future market circumstances based on the current ones, we can take lessons from the past. The overall confidence in the economy increases in the event of a market rally or a rise in the prices of shares. When stock prices rise and the market is bullish, people have more confidence in market conditions and their investments increases. They spend more on expensive items like house and car. It is also known as the wealth effect, which means that a change in a person's income affects their spending habits and ultimately leads to growth in the economy.

Present study concludes that there is a strong positive correlation between stock market movement and economy. Regression analysis determines that stock market movement influences the GDP of India in a positive manner. Stock market indices as an independent variable in the model explains 97 percent to the variability of the dependent variable GDP. The finding of this study finally replies its question that stock market influences the economy of India.

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